

REMARKS

Claims 48-74 were pending in this application. Claims 48-55, 60-72 and 74 were rejected by the Examiner and claims 56-59 and 73 objected to by the Examiner. Claims 48, 51, 62, 64 and 68 have been amended. Claims 48-74 are currently pending. Applicants reserve the right to pursue the original claims and other claims in this application and in other applications.

The Drawings

Figures 3 and 3a of the drawings were objected to on the grounds that they fail to comply with 37 CFR 1.84(p)(4) because reference characters 20, 21 50 and 13 in Fig. 3, and reference characters 20, 21, and 32 in Fig. 3a were used to designate the same elements. Applicants respectfully submit that each of these references is explained in the specification and the drawings comply with 37 CFR 1.84(p)(4). As described at paragraph [00074] of the specification, in Figs. 3 and 3a, reference element 20 refers to "supports." The supports can be located at one or more designated areas of the device. (*Id.*) As further explained in the specification, an embodiment of the supports 20 is posts 50. (*Id.*) An alternative embodiment of supports 20 is a support wall 32. (*Id.*) The specification makes clear that element 21 designates the "edge" of the device (*id.* at paragraph [00075]), and that element 12 designates a second micro lens array comprised of one or more second micro-lenses 13 (*id.* at paragraph [00065]). Applicants submit that the specification makes clear that elements 32 and 50 represent alternative embodiments of element 20, and further that elements 12, 13 and 21 do not designate the same elements as element 20 (or the alternate embodiments referenced by elements 32 and 50). Applicants requests the objection be withdrawn.

The Claims

Claims 48, 51, 64 and 68 were objected to because of informalities in the recited claim language as set forth at paragraph 3 of the Office Action. Applicants have amended the each of claims 48, 51, 64 and 68 to cure the informalities as suggested by the Examiner in the Office Action.

Claims 48-55, 60-61, 64-72 and 74 stand rejected under 35 USC 102(b) as anticipated by Fukusyo. Applicants respectfully traverse this rejection. The subject matter of the rejected claims is directed to a method in which a sacrificial material is used to fabricate an image sensor. Independent claim 48 for example is directed to a method of fabricating an image sensor including, *inter alia*, "applying a sacrificial material to the upper substrate layer; forming support molds in the sacrificial material; forming lens molds in the sacrificial material; forming supports by filling the support molds with a support material; forming a first micro-lens array having first micro-lenses by filling the lens molds with a first micro-lens material; and removing the sacrificial material." The subject matter of independent claim 64 is also directed to a method of fabricating an image sensor including, *inter alia*, "applying a sacrificial material above the upper substrate layer; . . . forming lens molds in the sacrificial material; forming a micro-lens array having micro-lenses by filling the lens molds with a micro-lens material; and removing the sacrificial material."

According to the manufacturing method for a solid-state imaging device disclosed in Fukusyo:

[An] overcoat layer is formed so as to cover the photosensing surface of the photosensing portion and the light shielding film and form the recessed portion by conforming to the surface shape of the light shielding film at

a position just above the photosensing surface. Thereafter, the lens layer is formed so as to fill the recessed portion. Thereafter, the surface of the lens layer is planarized.

(Fukusyo col. 6, lines 17-26). Fukusyo discloses that the overcoat layer 21 is conformed to the surface shape of the light shielding film and is used to form the lens molds. (*Id.*; see also *id* at col. 5, lines 2-27). Fukusyo teaches a method having an overcoat layer 21 that remains in, and forms part of, the structure of the imaging device. (*Id.* at col. 5 line 63- col. 6, line 11).

Fukusyo does not disclose or suggest the methods of independent claims 48 and 64. In particular, Fukusyo does not disclose the steps of claims 48, including the steps of: “applying a sacrificial material to the upper substrate layer; forming support molds in the sacrificial material; forming lens molds in the sacrificial material; forming supports by filling the support molds with a support material; forming a first micro-lens array having first micro-lenses by filling the lens molds with a first micro-lens material; and removing the sacrificial material.” Similarly, Fukusyo does not disclose the steps of claims 64, including the steps of: “applying a sacrificial material above the upper substrate layer; forming lens molds in the sacrificial material; forming a micro-lens array having micro-lenses by filling the lens molds with a micro-lens material; and removing the sacrificial material.”

Applicants request that the rejections of claim 48 (and its dependent claims 49-55, and 60-61) and of claim 64 (and its dependent claims 65-72 and 74) be withdrawn.

Claims 62 and 63 stand rejected under 35 USC 102(b) as anticipated by Burger. Applicants respectfully traverse this rejection.

Fig. 2 of Burger, which the Office Action relies on, discloses multiple, stacked substrates having an opto-mechanical fixturing 58 or spacing elements 68 separating multiple substrates. (Burger col. 20 line 26 – col. 21 line 50.) Burger discloses the micro-

lens arrays are within, and supported by, their corresponding substrates. Burger fails to disclose or suggest the subject matter of claims 62 and 63. However, to more clearly recite the subject matter of these claims, Applicants have amended independent claim 62 to recite a method of fabricating an image sensor including, *inter alia*, "providing a substrate having a plurality of photo sensors; forming one or more supports having distal and proximal ends wherein the distal ends are proximate the substrate; and forming a first micro-lens array in association with the substrate, the first micro-lens array having micro-lenses corresponding to said photo sensors and supported by the supports at said proximal ends wherein a cavity is formed between said first micro-lens array and said substrate." Although Burger discloses separation between the stacked *substrates*, Burger fails to disclose or suggest the limitations of claims 62 and 63. Applicants request that the rejections of claims 62 and 63 be withdrawn.

Applicants thank the Examiner for the notation of allowable subject matter. However, in view of the above amendments, applicant believes each of the claims of the pending application is in condition for allowance.

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Respectfully submitted,

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